

REMARKS

Applicants request favorable reconsideration and allowance of the present application in view of the foregoing amendments and the following remarks.

Claims 1, 3-8, 10-15, 17-26 and 30-33 are now pending in the present application. Claims 1, 8, 15, 19, 21, 23, 25, 30 and 32 are the independent claims.

Claims 1, 5, 8, 15, 21, 23, 25, 30, and 32 have been amended. No new matter has been added.

Applicants wish to express their gratitude to the Examiner for granting an interview with Applicants' undersigned representative on August 2, 2004. During the interview, the independent claims and various dependent claims were discussed, along with the rejections thereof over the citations listed below. During the interview, the patentability of the superimposition of a supervisory signal on the pumping light so as to achieve Raman amplification was discussed.

Claims 1, 3-8, 10-15, 17-26, and 30-33 stand rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 5,285,306 (Heidemann), or U.S. Patent No. 5,546,213 (Suyama), or U.S. Patent No. 6,452,721 (Deguchi et al.), in view of (OFC '99) or (Walker) and with (OECC) or U.S. Patent No. 6,344,922 (Grubb et al.). These rejections are respectfully traversed.

Each of independent claims recite the superimposing a supervisory signal on a selected one of a plurality of pump lights and using the plurality of pump lights (including the pump light on which the supervisory signal has been superimposed) to Raman amplify a wavelength division multiplexed (WDM) signal.

By at least the aforementioned features, a plurality of pump lights, including a selected one on which a supervisory signal has been superimposed, are supplied to a Raman amplification medium so as to Raman amplify a WDM signal propagating therethrough. Thus, only a selected component of the pump light is modified. And, by amplifying only a selected one of a plurality of pump lights used for Raman amplification, a wider gain wavelength band of the Raman amplifier is achieved. Thus, by superimposing the supervisory signal on a selected one of a plurality of pump lights and using the plurality of pump lights to Raman amplify the WDM signal, advantages are realized.

However, Applicants respectfully submit that none of the asserted citations teach or

suggest at least the aforementioned features of independent claims 1, 8, 15, 19, 21, 23, 25, 30 and 32. Thus, while not conceding the propriety of combining these citations as asserted in the Office Action, the asserted combinations of these citations is likewise deficient. In particular, the primary citations at least either: (1) do not teach or suggest superimposing a signal on pumping light; or (2) teach or suggest modulating a pump signal instead of (a) selecting one of a plurality of pump lights on which to superimpose a supervisory signal and (b) supplying the plurality of pump lights to a Raman amplification medium so as to Raman amplify a signal.

Heidemann relates to an optical communication system with a fiber optic amplifier and teaches a transmitting system that transmits a first optical signal based on a first information signal through an optical waveguide that includes a fiber-optic amplifier and transmits a second optical signal based on a second information signal via pumping light. The Heidemann system includes a modulator which modulates a pump source according to a modulating signal which contains the second information signal. (Heidemann, Abstract, Col. 2 and 4; FIGS. 1 and 2).

The Office Action contends that these teachings meet the aforementioned features of independent claims 1, 8, 15, 19, 21, 23, 25, 30 and 32. This contention is respectfully traversed.

First, Heidemann expressly teaches modulating a pump light source to emit a modulated pump light, not superimposing on a selected one of a plurality of pumping lights on a supervisory signal. Applicants respectfully submit that modulated pump light is not the same as selectively superimposing a supervisory signal on one of a plurality of pump lights. Second, Heidemann is silent as to supplying a plurality of pumping lights (including a selected one on which a supervisory signal has been superimposed) to a Raman amplification medium so as to Raman amplify a wavelength division multiplexed signal.

Deguchi et al. relates to a method, device, and system for evaluating characteristics of an optical fiber transmission line and teaches superimposing a supervisory signal on a main signal of an optical signal to be amplified. The supervisory signal can be updated based on a monitoring result of input power by a photodetector 14. Deguchi et al. further teaches that the transmission of the updated supervisory signal may be affected by intensity-modulating pump light. (Deguchi et al., Col. 6, lines 18-38).

The Office Action contends that these teachings meet the aforementioned features of independent claims 1, 8, 15, 19, 21, 23, 25, 30 and 32. This contention is respectfully traversed.

First, Deguchi et al. teaches superimposing a supervisory signal on a main signal, not on a selected one of a plurality of pump lights as recited in claims 1, 8, 15, 19, 21, 23, 25, 30 and 32. Second, Deguchi et al. is silent as to supplying the lights on which a supervisory signal has been superimposed to a Raman amplification medium so as to Raman amplify a wavelength division multiplexed signal. Instead, Deguchi et al. teaches amplifying the signal on which the supervisory signal has been superimposed.

Suyama relates to an optical amplifier and optical communication system provided with the optical amplifier and teaches transmitting information with a pumping light beam acting as the carrier in addition to transmitting information with the signal beam. Suyama teaches that when a pumping light beam having a predetermined relationship with a signal beam are propagated through an erbium doped fiber together, undesirable fluorescence results. To solve this problem, Suyama teaches modulating the pump light based on a high-frequency signal whose period is shorter than the life span of the fluorescence. (Suyama, Abstract).

The Office Action contends that these teachings meet the aforementioned features of independent claims 1, 8, 15, 19, 21, 23, 25, 30 and 32. This contention is respectfully traversed.

Suyama teaches modulating the frequency of a pumping light beam. However, Suyama is silent as to superimposing on a selecting one of a plurality of pump lights a supervisory signal. Further, Suyama is silent as to using the beam on which a supervisory signal is superimposed to Raman amplify a wavelength division multiplexed signal.

The secondary citations OFC '99 and Walker are cited for their alleged teachings of the use of Raman amplifiers instead of doped fiber amplifiers and the benefits of WDM signal transmission. OECC and Grubb et al. are cited for their alleged teachings of the use of plural pump wavelengths to pump Raman amplifiers operating in WDM modes. (Office Action, page 4). Applicants respectfully submit that none of OFC '99, Walker, OECC, and Grubb et al. add anything to the teachings of Heidemann, Suyama, and Deguchi, et al. that would remedy the aforementioned deficiencies.

Accordingly, favorable reconsideration and withdrawal of the rejection of independent claims 1, 8, 15, 19, 21, 23, 25, 30 and 32 under 35 U.S.C. § 103 are respectfully requested.

In view of the foregoing, Applicants respectfully submit that the independent claims patentably define the present invention over the citations of record. Further, the dependent

claims should also be allowable for the same reasons as their respective base claims and further due to the additional features that they recite. Separate and individual consideration of the dependent claims is respectfully requested.

Applicants believe that the present Amendment is responsive to each of the points raised by the Examiner in the Official Action. However, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to such matters.


There being no further outstanding objections or rejections, it is submitted that the present application is in condition for allowance. An early action to that effect is courteously solicited.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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Date: 8/27/04

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